VEGF-mediated cross-talk within the neonatal murine thymus.

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Public Summary:

Scientific Abstract:
Although the mechanisms of cross-talk that regulate the hematopoietic and epithelial compartments of the thymus are well established, the interactions of these compartments with the thymic endothelium have been largely ignored. Current understanding of the thymic vasculature is based on studies of adult thymus. We show that the neonatal period represents a unique phase of thymic growth and differentiation, marked by endothelium that is organized as primitive, dense networks of capillaries dependent on vascular endothelial growth factor (VEGF). VEGF dependence in neonates is mediated by significantly higher levels of both VEGF production and endothelial VEGF receptor 2 (VEGF-R2) expression than in the adult thymus. VEGF is expressed locally in the neonatal thymus by immature, CD4(-)CD8(-) "double negative" (DN) thymocytes and thymic epithelium. Relative to adult thymus, the neonatal thymus has greater thymocyte proliferation, and a predominance of immature thymocytes and cortical thymic epithelial cells (cTECs). Inhibition of VEGF signaling during the neonatal period results in rapid loss of the dense capillaries in the thymus and a marked reduction in the number of thymocytes. These data demonstrate that, during the early postnatal period, VEGF mediates cross-talk between the thymocyte and endothelial compartments of the thymus.